

Sub 1  
A method for the fabrication of a double-sided electrical interconnection flexible circuit (200) particularly useful as a substrate for an area array integrated circuit package. A copper matrix with studs (203) is pressed through a dielectric film (201) having a copper layer on the opposite surface, thereby forming an intermediate structure for a flex circuit with self-aligned solid copper vias in a one step process. The contacts are reinforced by plating both surfaces with a layer of copper, and conventional processes are used to complete the circuit patterning.

In the Claims:

Please amend the claims as follows:

Please cancel non-elected claims 10-15, 17, 19, and 20 without prejudice.

16. (twice amended) A method of manufacturing an intermediate base structure for a flex circuit including the steps of:

a) providing a flexible base polymer film having first and second surfaces and a layer of copper on the first surface;

c 2 b) providing a metal matrix embossing tool comprising a copper film having a plurality of transverse copper studs integral therewith; placing said tool studs in contact with said second surface;

c) applying a force to said metal matrix embossing tool so that the studs of the tool punch through the copper coated polymer film, thereby creating a plurality of vias filled with the studs, and attaching the film matrix to the second surface of the polymer film;

d) electroplating a thin film of copper onto both sides of the copper coated polymer film.

18. (twice amended) A method of manufacturing a flex circuit on a flexible base polymer film including the steps of:

a) superimposing on said film an embossing tool having raised areas comprising a pattern of conductors and vias corresponding to a circuit design, wherein, said raised areas are coated with a thin layer of metal, comprising copper,

- b) applying heat and pressure to simultaneously emboss the film and to transfer said thin metal layer from the embossing tool to the polymer film,
- c) removing the embossing tool,
- d) embossing a pattern corresponding to that of the second surface of a flex circuit, and simultaneously transferring a thin layer of metal into the embossed pattern,
- e) physically removing the embossing tool,
- f) plating a layer of copper to fill the vias and conductor patterns on both sides of the film,
- g) plating a layer of nickel and gold onto the exposed copper patterns, and
- h) applying a solder mask on the surface of the film surrounding the solder ball contact pads.

C3  
Please add the following new claims.

21. (new) A method of manufacturing a flex circuit on a flexible base polymer film including the steps of:

- a) positioning adjacent to said film an embossing tool having raised areas comprising a pattern of conductors and vias corresponding to a circuit design, wherein said raised areas are coated with a thin layer of metal;
- b) applying heat and pressure on said tool to simultaneously emboss the film and to transfer said thin metal layer from the embossing tool to the polymer film; and
- c) plating a second layer of metal on said transferred thin metal layer.

22. (new) The method of Claim 21, wherein said thin layer of metal is copper.

23. (new) The method of Claim 21, wherein said second layer of metal is copper.

24. (new) The method of Claim 21, comprising the step of plating at least one additional layer on said second layer of metal.